

What is claimed is:

1       1. A color image processing apparatus comprising:  
2               object color designating means for designating an object  
3               color to be converted in an input color image;  
4               optimum color setting means for setting an optimum color  
5               corresponding to said object color designated by said object  
6               color designating means;  
7               lightness conversion factor obtaining means for  
8               obtaining a lightness conversion factor based on said object  
9               color and said optimum color; and  
10              lightness converting means for converting the input color  
11             image in lightness using said lightness conversion factor to  
12             create a lightness-changed color image.

1       2. A color image processing apparatus according to claim  
2       1, wherein:  
3               said lightness converting means converts said object  
4               color in lightness using said lightness conversion factor to  
5               create a lightness-changed object color; and  
6               said apparatus further comprises hue and chroma  
7               converting means for converting said lightness-changed color  
8               image in hue and chroma based on a color difference between said  
9               lightness-changed object color and said optimum color.

1       3. A color image processing apparatus according to claim  
2       1, wherein:

3           said object color designating means designates a  
4        plurality of object colors;

5           said optimum color setting means sets a plurality of  
6        optimum colors respectively corresponding to the plural object  
7        colors; and

8           said lightness conversion factor obtaining means obtains  
9        a plurality of individual lightness conversion factors  
10      respectively corresponding to said plural object colors and  
11      said plural optimum colors, and also obtains an average  
12      weighting value of said plural individual lightness conversion  
13      factors as said lightness conversion factor, using weighting  
14      factors respectively corresponding to said plural optimum  
15      colors.

1           4. A color image processing apparatus according to claim  
2        2, wherein:

3           said object color designating means designates a  
4        plurality of object colors;

5           said optimum color setting means sets a plurality of  
6        optimum colors respectively corresponding to the plural object  
7        colors; and

8           said lightness conversion factor obtaining means obtains  
9        a plurality of individual lightness conversion factors  
10      respectively corresponding to said plural object colors and  
11      said plural optimum colors, and also obtains an average  
12      weighting value of said plural individual lightness conversion  
13      factors as said lightness conversion factor, using weighting

14 factors respectively corresponding said plural optimum colors.

1           5. A color image processing apparatus according to claim  
2, wherein:

3           said apparatus further comprises an optimum color  
4 database previously retaining color values of various optimum  
5 colors; and

6           said optimum color setting means sets said optimum color  
7 corresponding to said object color as selected from said optimum  
8 color database.

1           6. A color image processing apparatus according to claim  
2, wherein:

3           said apparatus further comprises an optimum color  
4 database previously retaining color values of various optimum  
5 colors; and

6           said optimum color setting means sets said optimum color  
7 corresponding to said object color as selected from said optimum  
8 color database.

1           7. A color image processing apparatus according to claim  
2, wherein:

3           said apparatus further comprises an optimum color  
4 database previously retaining color values of various optimum  
5 colors and also weighting factors corresponding to the  
6 individual optimum colors;

7           said optimum color setting means sets more than one

8 optimum colors respectively corresponding to said plural object  
9 colors as selected from said optimum color database; and  
10 said lightness conversion factor obtaining means reads  
11 out more than one weighting factors corresponding to the  
12 individual optimum colors from said optimum color database.

1 8. A color image processing apparatus according to claim  
2 4, wherein:

3 said apparatus further comprises an optimum color  
4 database previously retaining color values of various optimum  
5 colors and also weighting factors corresponding to the  
6 individual optimum colors;

7 said optimum color setting means sets more than one  
8 optimum colors respectively corresponding to said plural object  
9 colors as selected from said optimum color database; and  
10 said lightness conversion factor obtaining means reads  
11 out more than one weighting factors corresponding to the  
12 individual optimum colors from said optimum color database.

1 9. A computer-readable recording medium in which a color  
2 image processing program is recorded, wherein said color image  
3 processing program instructs a computer to function as the  
4 following:

5 object color designating means for designating an object  
6 color to be converted in an input color image;

7 optimum color setting means for setting an optimum color  
8 corresponding to said object color designated by said object

9 color designating means;  
10       lightness conversion factor obtaining means for  
11 obtaining a lightness conversion factor based on said object  
12 color and said optimum color; and  
13       lightness converting means for converting the input  
14 color image in lightness using said lightness conversion factor  
15 to create a lightness-changed color image.

1       10. A computer-readable recording medium according to  
2 claim 9, wherein:

3       said color image program said lightness converting means  
4 converts said object color in lightness using said lightness  
5 conversion factor to create a lightness-  
6 changed object color; and  
7       said color processing program further instructs the  
8 computer to function as hue and chroma conversion means for  
9 converting said lightness-changed color image in hue and chroma  
10 based on a color difference between said lightness-changed  
11 object color and said optimum color.

1       11. A computer-readable recording medium according to  
2 claim 9, wherein:

3       said object color designating means designates a  
4 plurality of object colors;  
5       said optimum color setting means sets a plurality of  
6 optimum colors respectively corresponding to the plural object  
7 colors; and

8           said lightness conversion factor obtaining means obtains  
9        a plurality of individual lightness conversion factors  
10      respectively corresponding to said plural object colors and  
11      said plural optimum colors, and also obtains an average  
12      weighting value of said plural individual lightness conversion  
13      factors as said lightness conversion factor, using weighting  
14      factors respectively corresponding to said plural optimum  
15      colors.

1           12. A computer-readable recording medium according to  
2        claim 10, wherein:

3           said object color designating means designates a  
4        plurality of object colors;

5           said optimum color setting means sets a plurality of  
6        optimum colors respectively corresponding to the plural object  
7        colors; and

8           said lightness conversion factor obtaining means obtains  
9        a plurality of individual lightness conversion factors  
10      respectively corresponding to said plural object colors and  
11      said plural optimum colors, and also obtains an average  
12      weighting value of said plural individual lightness conversion  
13      factors as said lightness conversion factor, using weighting  
14      factors respectively corresponding to said plural optimum  
15      colors.

1           13. A color image processing method comprising the steps  
2        of:

1 14. A color image processing method according to claim  
2 13, wherein:

3           in said lightness converting step (d), said object color  
4    is converted in lightness, using said lightness conversion  
5    factor, to create a lightness-changed object color; and  
6           said method further comprises a step of converting said  
7    lightness-changed color image in hue and chroma based on a color  
8    difference between said lightness-  
9    changed object color and said optimum color.

1                   15. A color image processing method according to claim  
2                   13, wherein:

3           in said object color designating step (a), a plurality  
4    of object colors are designated;  
5           in said optimum color setting step (b), a plurality of  
6    optimum colors respectively corresponding to the plural object  
7    colors are set; and

8           in said lightness conversion factor obtaining step (c),  
9    a plurality of individual lightness conversion factors  
10   respectively corresponding to said plural object colors and  
11   said plural optimum colors are obtained, and then an average  
12   weighting value of said plural individual lightness conversion  
13   factors is obtained as said lightness conversion factor using  
14   weighting factors respectively corresponding to said plural  
15   optimum colors.

1           16. A color image processing method according to claim  
2    14, wherein:

3           in said object color designating step (a), a plurality  
4    of object colors are designated;

5           in said optimum color setting step (b), a plurality of  
6    optimum colors respectively corresponding to the plural object  
7    colors are set; and

8           in said lightness conversion factor obtaining step (c),  
9    a plurality of individual lightness conversion factors  
10   respectively corresponding to said plural object colors and  
11   said plural optimum colors are obtained, and then an average  
12   weighting value of said plural individual lightness conversion  
13   factors is obtained as said lightness conversion factor using  
14   weighting factors respectively corresponding to said plural  
15   optimum colors.

1           17. A color image processing apparatus comprising:  
2           object color designating means for designating an object

3 color to be converted in an input color image;  
4 optimum color setting means for setting an optimum color  
5 corresponding to said object color designated by said object  
6 color designating means;

7 preliminary lightness conversion amount obtaining means  
8 for obtaining a preliminary lightness conversion amount in  
9 accordance with a differential value in lightness between said  
10 object color and said optimum color;

11 practical lightness conversion amount obtaining means  
12 for obtaining a practical lightness conversion amount by  
13 compensating said preliminary lightness conversion amount so  
14 as to decrease said preliminary lightness conversion amount  
15 commensurate with the largeness of said preliminary lightness  
16 conversion amount;

17 lightness conversion factor obtaining means for  
18 obtaining a lightness conversion factor based on said practical  
19 lightness conversion amount, said object color and said optimum  
20 color; and

21 lightness converting means for converting the input color  
22 image in lightness using said lightness conversion factor to  
23 create a lightness-changed color image.

1 18. A color image processing apparatus according to  
2 claim 17, wherein said practical lightness conversion amount  
3 obtaining means obtains said lightness conversion amount such  
4 as to approximate a predetermined value as said preliminary  
5 lightness conversion amount increases.

1           19. A color image processing apparatus according to  
2 claim 17, further comprising preliminary lightness converting  
3 means for preliminarily converting the input color image in  
4 lightness, based on a histogram or a maximum/minimum/average  
5 value of pixel information in the input color image, to create  
6 a preliminary amended-lightness color image as the color image.

1           20. A color image processing apparatus according to  
2 claim 18, further comprising preliminary lightness converting  
3 means for preliminarily converting the input color image in  
4 lightness, based on a histogram or a maximum/minimum/average  
5 value of pixel information in the input color image, to create  
6 a preliminary amended-lightness color image as the color image.

1           21. A computer-readable recording medium in which a  
2 color image processing program is recorded, wherein said color  
3 image processing program instructs a computer to function as  
4 the following:

5           object color designating means for designating an object  
6 color to be converted in an input color image;

7           optimum color setting means for setting an optimum color  
8 corresponding to said object color designated by said object  
9 color designating means;

10          preliminary lightness conversion amount obtaining means  
11 for obtaining a preliminary lightness conversion amount in  
12 accordance with a differential value in lightness between said

13       object color and said optimum color;

14            practical lightness conversion amount obtaining means

15        for obtaining a practical lightness conversion amount by

16        compensating said preliminary lightness conversion amount so

17        as to decrease said preliminary lightness conversion amount

18        commensurate with the largeness of said preliminary lightness

19        conversion amount;

20            lightness conversion factor obtaining means for

21        obtaining a lightness conversion factor based on said practical

22        lightness conversion amount, said object color and said optimum

23        color; and

24            lightness converting means for converting the input color

25        image in lightness using said lightness conversion factor to

26        create a lightness-changed color image.

1           22. A computer-readable recording medium according to

2        claim 21, wherein said practical lightness conversion amount

3        obtaining means obtains said lightness conversion amount such

4        as to approximate a predetermined value as said preliminary

5        lightness conversion amount increases.

1           23. A computer-readable recording medium according to

2        claim 21, wherein said color processing program further

3        instructs the computer to function as preliminary lightness

4        converting means for preliminarily converting the input color

5        image in lightness, based on a histogram or a

6        maximum/minimum/average value of pixel information in the input

7 color image, to create a preliminary amended-lightness color  
8 image as the color image.

1 24. A computer-readable recording medium according to  
2 claim 22, wherein said color processing program further  
3 instructs the computer to function as preliminary lightness  
4 converting means for preliminarily converting the input color  
5 image in lightness, based on a histogram or a  
6 maximum/minimum/average value of pixel information in the input  
7 color image, to create a preliminary amended-lightness color  
8 image as the color image.

1 25. A color image processing method comprising the steps  
2 of:

3 (a) designating an object color to be converted in an  
4 input color image;

5 (b) setting an optimum color corresponding to said object  
6 color designated by said designating step (a);

7 (c) obtaining a preliminary lightness conversion amount  
8 in accordance with a differential value in lightness between  
9 said object color and said optimum color;

10 (d) obtaining a practical lightness conversion amount by  
11 compensating said preliminary lightness conversion amount so  
12 as to decrease said preliminary lightness conversion amount  
13 commensurate with the largeness of said preliminary lightness  
14 conversion amount;

15 (e) obtaining a lightness conversion factor based on said

16 practical lightness conversion amount, said object color and  
17 said optimum color; and

18 (f) converting the input color image in lightness using  
19 said lightness conversion factor to create a lightness-changed  
20 color image.

1 26. A color image processing method according to claim  
2 25, wherein in said practical lightness conversion amount  
3 obtaining step (d), said lightness conversion amount such as  
4 to approximate a predetermined value is obtained as said  
5 preliminary lightness conversion amount increases.

1 27. A color image processing method according to claim  
2 25, further comprising a step of preliminarily converting the  
3 input color image in lightness, based on a histogram or a  
4 maximum/minimum/average value of pixel information in the input  
5 color image, to create a preliminary amended-lightness color  
6 image as the color image.

1 28. A color image processing method according to claim  
2 26, further comprising a step of preliminarily converting the  
3 input color image in lightness, based on a histogram or a  
4 maximum/minimum/average value of pixel information in the input  
5 color image, to create a preliminary amended-lightness color  
6 image as the color image.